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MICROSCOPIC FORMS IN BUFFALO WATER SUPPLY, by Henry Mills
(Page 165.)

Mr. Vorce said, Is not much of the variation of the organisms seen in the water supply caused by some difference in the arrangement of the pumping works? He had found that changes in the supply system at Cleveland made great changes in the organisms found, and he understood that there had been a change made in Buffalo by the introduction of a new pumping system. If that change occurred during the time covered by the studies described in this paper the conclusions of the author might have less weight. The use of the stand pipe system necessitates that when the water is drawn off after a period of rest the sediment which has accumulated when the water was at rest is carried out at once and an abundance of living matter will be found at such a time. This will be so especially in the outer parts of the city. In the central portion the water is flowing more or less constantly all the time, and the samples taken at one time will agree more nearly with those at another, or rather will vary more nearly in proportion to the real variation in the lake from which the supply is drawn.

Dr. W. C. Barrett said, There had been a striking difference in the water-supply made of late in some parts of Buffalo. The Holly system of continuous pumping had been introduced in place of the reservoir system, and a large difference in the character and amount of living matter in the water had resulted. This was an important factor in such studies.

Mr. Mills said, His house was on Fargo avenue, and no change had been made in the water-supply on that street.

Prof. T. J. Burrill said, He had no experience in the piped water-supply of cities, but had studied with some care the water-supply of his own place where the water is obtained from wells. These penetrate to a stratum of sand beneath clay and so do not contain surface-water. He had never found any bacteria or ciliated infusoria or any such matter in any of the water from these wells; but infusoria are found, and these other forms also, in cistern-water, showing that the wells are a much purer source of supply than cisterns.

NOTES ON SPECIAL METHODS AND APPARATUS.

Prof. A. H. Chester described a method of making tin rings for cells. He had been looking for a long time for a form of cell that was permanent—not affected by heat or cold, and one that was cheap and easily worked. He believed that the tin cell from pure tin foil satisfies these conditions more perfectly than any other form yet proposed, and he had experimented upon various methods of manufacture, and had settled upon the following: He procured of Crooke Brothers, 163 Mulberry street, New York, tin foil or sheet tin rolled from pure block tin, of two or three different thicknesses, though he found a thickness of about $\frac{3}{16}$ of an inch to be a most generally useful size. He then punched out the circles, by the use of two punches of proper size. It was, however, almost impossible to make the two circles concentric and smooth; so after a number were punched out he placed them on a mandrel of size to fit the inside circle exactly, and placing it in a lathe, turned down the outside perfectly true. The whole operation was easily and quickly done, and he could now get them made for him at an expense of fifty cents a hundred, or less. If deeper cells are wanted, it is easy to cement any number of these rings together. It should be noted, however, that the ordinary gun punch will only answer for cutting the outer ring, as it is designed not to cut holes, but discs of the proper shape; but by taking a punch of a size somewhat smaller than the inside of the ring and grinding off the lower edge, it can be put in a lathe and the edge beveled off on the inside, instead of outside, so that it will cut out true circles, leaving the inside hole square and smooth.

Prof. A. McCalla said, He had seen a letter from Prof. Chester, which first called his attention to this form of the cells, and he had tried the method, and could testify to its efficiency and to the excellence and cheapness of the cells thus made. He had also varied the method somewhat, by first making a lever-punch, consisting of a solid or hollow plunger, fitting in a hole in a steel plate, and actuated by a lever, as in a notary's seal. This punched out the inner hole, and a different sized punch would cut the outer circle, if desired, but he usually found it easier to cut the

rings apart with a pair of shears, without attempting to make them round on the outside, as the lathe cutting did that part perfectly. He had also tried fitting rotary cutters on the lathe, to cut out several consecutive circles at once, something on the same principle as that by which leather washers are cut. This he had not fully perfected, as yet, but believed it to be a good plan, as it would obviate the necessity of turning the rings down on the lathe, by making the circles consecutive at the first, and would also utilize all the sheet of tin more fully. He believed the tin ring superior to any other cell for most purposes. He might add that the pure sheet tin-foil could be obtained cheaply, and in any thickness desired, from the John J. Crooke Company, 84 to 88 Franklin street, Chicago, Ill., manufacturers of tin-foil in all forms.

Prof. A. Y. Moore, M. D., described a modification of the camera lucida, consisting of a plain piece of glass placed obliquely over the eye-glass of the eye-piece,—a common cover glass answering the purpose,—having a small circle silvered upon it. The trouble with the ordinary thin glass reflector, whether of neutral tint, as Beale recommends, or of common glass, is that it requires such an intense light, especially with the high powers, to get any view of the object. He had, therefore, been led to this plan. The methods of silvering glass was given in the various scientific journals and works of reference, and he would not, therefore, stop to describe the process. After the glass was silvered, however, it was difficult to cut the film away from the unsilvered portion and leave a sharp dividing line. He had found that, by temporarily cementing the cover to a slide by its plain surface and centering on the turn-table, he could cut away all but a small disc of silver in the center, having a very sharp line at its edge. Then another cover-glass, of same size, was permanently cemented to the silvered surface with balsam or damar, to protect the mirror, when it was ready for mounting in position.

Dr. Mercer described and exhibited a modification of Williams' well-known English freezing microtome devised by Mr. F. A. Paul of Syracuse, N. Y., who was unable to be present to exhibit it in person. The original form, as now made and sold by Swift, of London, consists of a hollow cylinder on whose top

the mass to be cut is laid, and within which a freezing mixture is applied. This is enclosed in an outer-cylinder with broad top, over which the razor slides, and which screws down on the inner cylinder as one section after another is cut. Mr. Paul has modified this, first, by making the inner cylinder movable, while the outer one is fixed. The inner cylinder carrying the frozen mass is attached to the short arm of a lever below. The long arm of this lever is actuated by a fine screw which extends up above the upper plate, and is filled, not with a milled head, but with a toothed-wheel. Then, instead of holding the knife in the hand, it is attached to a framework of ingenious shape, which works on a pivot in the upper plate and rests by two rounded legs on that plate as it moves over it. A hinge in the frame allows the razor to be lifted clear of the imbedded material on the return movement, while in the cutting movement it travels with exact mechanical accuracy. Then he arranges that an adjustable catch on the razor-frame shall turn the toothed-wheel and its screw through a certain part of a revolution, and so elevate the mass to be cut by any exact amount that may be desired, at each cut of the knife, thus severing any number of sections of exactly the same thickness, in regular succession. The razor is held in this frame by adjusting screws, so that it can be made to cut at any desired closeness to the upper plate, and set at any obliquity to that plate and to its line of movement, and can be instantly removed and replaced for frequent strapping. It does not touch the plate, however, but only the frozen mass, and so retains its edge much longer than in the original form where it rests on the brass top of the outer-cylinder. Dr. Mercer exhibited a number of sections cut by this instrument.

NOTE.—The papers on the "Epidermis of *Marsipobranchii*," and on "A New Species of Fluke," by A. H. Tuttle, were sent in by the author for this meeting of the Society. Illness, both before and since the time of the meeting, has prevented his completing the papers in a form suitable for publication in time for the present volume. He has therefore requested to withdraw them, and to present them in a complete form at the next year's meeting at Chicago.—[COM. ON PUB.]